

ABSTRACT OF THE DISCLOSURE

This invention is embodied in an improved process for growing high-quality silicon dioxide layers on silicon by subjecting it to a gaseous mixture of nitrous oxide (N_2O) and ozone (O_3). The presence of O_3 in the oxidizing ambiance greatly enhances the oxidation rate compared to an ambiance in which N_2O is the only oxidizing agent. In addition to enhancing the oxidation rate of silicon, it is hypothesized that the presence of O_3 interferes with the growth of a thin silicon oxynitride layer near the interface of the silicon dioxide layer and the unreacted silicon surface which makes oxidation in the presence of N_2O alone virtually self-limiting. The presence of O_3 in the oxidizing ambiance does not impair oxide reliability, as is the case when silicon is oxidized with N_2O in the presence of a strong, fluorine-containing oxidizing agent such as NF_3 or SF_6 .